

TITLE

Roofers tool

BACKGROUND OF THE INVENTION

Field of invention

This invention relates generally to hand tools and, more specifically to an improved
5 roofers tool with a geometry allowing for the removal of a plurality of sizes of roofing
staples as well as conventional roofing nails and spikes.

Description of prior art.

In replacement of roofing on homes or other dwellings it is most common to remove the
old worn out shingles or composition material from the roof prior to installing a new
10 covering. This procedure is often necessary to allow inspection of the under structure of
the roof beneath the roofing while providing for a clean flat surface for installation of the
new roof covering. The removal of the older roofing material is usually tedious and time
consuming due to the fact that the older worn out roofing materials have a tendency to
break apart where fastenings secured them in place leaving the nails or staples that held it
15 in place tightly lodged in the under structure. Due to the fact that the old nails or staples
protruding from the roof surface will damage the new materials when installed, it is
imperative that the old fasteners be removed.

A number of utility tools have been developed and used over the years to facilitate the
removal of old roofing nails and staples ranging from simple crow bars to carpenters
20 hammers. Generally however, the tools were primarily suited to extracting nail type
roofing fasteners. As it has been more common in recent years to utilize the easier
applied staples in place of nails, the more conventional tools which were designed

primarily for nail pulling have proven to be less effective on roofing staples requiring the roofer to use additional tools such as small pry bars, pliers and in some cases, even modified straight slot or flat bladed screw drivers. Generally, the method for removing the nails and staples has been to use anything that can be wedged under the fastener and operates on the principal of a first class lever wherein the load is at or near one end of the prying tool and the effort of force is applied to the other end with a fulcrum or pivot point located somewhere between the load and the effort. Tools like the pry bar or "Utility bar" as outlined in Khachatoorian's patent No. 6,257,553 have been used over the years for this purpose. Although this tool accommodates nails quite well, it is of little use for removing staples as the configuration of the puller is arranged to accommodate primarily, common nails with heads. There are tools that have been designed more specifically for pulling staples as outlined in Rocheford's "Staple removing tool" US patent 6,308,935, Brumfield's "Staple remover" US Patent No. 4,219,187 or Thurmston's "Staple and tack extractor" US Patent No. 5,031,881. They are however substantially less rugged than needed for the heavier roofing fasteners, and intended more for use on furniture reupholstering or removing staples from cardboard boxes. These tools are intended primarily for the removal of staples only and are not generally designed or intended for nail extraction.

There are also a number of more expensive and complex pullers that have been introduced in recent years that function very much like standard pliers. Pearson's "Shake nail puller" US Patent No. 4,798,366, Henning's "Nail puller" US Patent No. 4,997,163, or Johnston's "Staple removal tool" US Patent No. 5,996,969 are of a design that utilizes

a set of jaws actuated by a squeeze grip either grabbing the staple on it's outside geometry or sliding under the bridge portion of the staple whereby using a rocking or prying motion of the tool, can extract the staple. In review of the above referenced patents we can see that there are a number of tools that will remove nails as well as some
5 innovative designs that address the removal of staples. A single simple tool as outlined in the following summary however, designed with the versatility to pull long nails, short nails and a plurality of standard staple sizes could greatly simplify the" removal of the old roofing and staples" and greatly increase the efficiency of the re- roofing process.

SUMMARY

Accordingly, it is an object of this invention to provide a universal staple and nail pulling
5 tool that does not have the limited capability inherent in prior art pullers comprising a.
simple pry bar design provisioned to remove a plurality of sizes of both roofing staples
and roofing nails by incorporating in one tool a plurality of nail pulling details as well as
a prying foot arranged with staple pulling fingers that will accommodate a plurality of
standard staple sizes.

10 It is yet another object of this invention to provide additional nail and spike pulling
capability for removing nails of extended length.

It is a further object of this invention to provide a staple and nail puller as described
above with geometry allowing the user good visibility of the fasteners to be pulled.

In order to achieve the above objectives, a universal roofers tool is provided. The
15 universal roofers tool being comprised of a forged, tempered "L" shaped steel flat bar
with integrally formed U-shaped prying foot and arranged with a plurality of staple
pulling fingers for removing nails and staples of varying dimension on one end, and
multiple means for removing larger and longer nails as may be required, in the mid
section and opposite end of the universal tool.

20 The above advantages and subsequent detailed description will be more readily
understood by reference to the following illustrations.

DESCRIPTION OF THE DRAWINGS

A universal roofers tool embodying the features of the invention is illustrated in the following drawings forming part of this application, where in:

FIG. 1 is a perspective view of the universal roofers tool

FIG. 2 a and 2b are side and front views respectively of the preferred embodiment of the universal roofers tool.

FIG. 3 is a prospective view of staple pulling finger details of universal roofers tool.

FIG. 3a is a side and front view respectively of optional staple pulling finger geometry.

FIG. 4 is a perspective view of universal roofers tool spike pulling detail and diamond notch nail puller.

FIG. 5 Is a side and ghost views of universal roofers tool referencing operation.

Referring now to figures 1 through figure 5 in which identical parts are designated by the same reference numbers

Where in **FIG 1** shows a universal staple and nail pulling tool in accordance with the present invention herein referred to as tool **10** being comprised of an elongated flat steel bar whose main body will herein be referred to as the shank **13**. Shank **13** cross section at mid section **16** being approximately 1 ¼" wide and ¼" in thickness having a front facing surface **17** and a back facing surface **18**. A foot **11** defining the first end of the primary prying foot protrudes out in the direction of front surface **17** of shank **13**, and grip end **12** defines a second end and a secondary prying surface. A large radius bend forming fulcrum **28** is formed in the direction of back surface **18** of shank **13**. Tool **10** is approximately 15" in length measured from crown **14** on grip end **12** to base **15** of foot end **11**. Foot end **11** and grip end **12** of Shank **13** to be substantially flared to approximately 1 ¾" measured approximately at section **19** adjacent to staple puller fingers **1,3,5** and **7** on foot end **11** and at width **20** adjacent to crown **14** on grip end **12** of shank **13** on tool **10**. Tool **10** to be provided for with a "V" groove spike and nail puller **21** substantially centered in crown **14** of grip end **12**, an additional "V" groove nail puller **22** substantially centered between and integrated into geometry defining staple pulling fingers **3** and **5** on foot **11** of tool **10**. A diamond notched nail puller **23** in shank **13** is provided for pulling nails or spikes of extended length.

Major longitudinal dimension of tool **10** is substantially parallel to offset layout line **24** and centerline **30** (see fig.2b) of shank **13**. Plane line **25** is parallel to base **15**. Offset layout line **24** intersects with plain line **25** at intersect point **26** forming an approximate

97 degree angle 27 which defines the approximate “L” shape of tool 10 . The integrally formed large radius bend in shank 13 provides a fulcrum 28 when tool 10 is utilized as a simple class one lever in conjunction with spike puller 21. Integrally formed rocker 29 on foot end 11 of tool 10 also allows tool 10 to function as a simple class one lever when implementing staple pulling fingers 1,3,5 and 7 or nail puller 22 on foot 11 end of tool 10. Tool 10 functions as a class two lever when diamond notch nail puller 23 in shank 13 of tool 10 is being utilized. Thus, tool 10 can be utilized in a plurality of ways for the purpose of gaining mechanical advantage when pulling or removing standard sizes of roofing staples as well as various sizes of roofing nails and spikes.

Referring now to Fig.2a and 2b further defining profile geometry of tool 10 wherein offset layout line 24 defines the major longitudinal axis of tool 10 and is substantially parallel to physical centerline 30 of shank 13, and base 15 on foot 11 of tool 10 is approximately parallel to plane line 25 and where offset layout line 24 and plane line 25 intersect at 26 to form angle 27 which is approximately 97 degrees and is provided to allow operator improved visibility of staple pulling foot 11 when tool 10 is in use. Rocker 29 is the fulcrum point for foot 11 and is generated at foot 11 of shank 13 by forming two opposing and intersecting .750” radius “X” and “Y” into foot 11 of tool 10. Center point 31 for generating radius “X” is located substantially on offset layout line 24 a distance of 2” from plane line 25. Center point 32 for generating radius “Y” is located substantially on physical centerline 30 of shank 13 approximately 1” from plane line 25. Radius “Y” merges with radius “X” at point 35 and with base 15 at the point where base 15 of foot 11 of tool 10 is approximately parallel to plane line 25. The merging of directionally

opposing Radius "X" and radius "Y" at point 35 provide rocker 29 with an approximate 1" offset 36. Offset 36 of 1" is the sum of shank 13 mid section 16 thickness of approximately .250" and .750" inside measurement of radius "Y".

Continuing to reference FIG 2a wherein radius "Z" 37 is integrally formed in grip end 12

5 of tool 10 Wherein Radius "Z" 37 is an Integral bend of approximately 9" radius starting at point 38 on shank 13 of tool 10. Point 38 is approximately 10 1/2" from plane line 25.

Radius "Z" 37 terminates at the point where crown 14 intersects with offset layout line 24. Radius "Z" 37 provides for fulcrum 28 (see fig.1) on front 17 of shank 13 of tool 10 and is used in conjunction with spike and nail puller 21 on grip end 12 of tool 10 and

10 when utilizing diamond notched nail puller 23 in shank 13 of tool 10 as shown in Fig 5

Referring now to FIG. 2b wherein a front view of tool 10 illustrates location of diamond notch nail puller 23 provided for pulling nails of extended length. Diamond notch nail puller 23 geometry is substantially centered in shank 13 of tool 10 with center 39 substantially located on minor axis 75 approximately 9 1/2" (d) from plane line 25.

15 Continuing to reference Figs. 2 a and 2b wherein the thickness of shank 13 foot print area 40 of fulcrum 28 on grip 12 end of tool 10 is diminished to approximately 50% 49 of it's original thickness utilizing a sanding or grinding process. Sanding or grinding process on footprint 40 area to start approximately at point 38 where radius "Z" 37 blends into straight section of shank 13 with material removal increased gradually from

20 point 38 to crown 14 resulting in approximately 50% of the beginning thickness 16 of shank 13 at crown 14 of tool 10. The same grinding or sanding process to footprint area 41 for reducing the thickness of footprint area 41 of foot 11 on tool 10 to start

approximately at centerline **30** where radius “Y” **32** blends into base **15** on foot **11** of tool **10** decreasing thickness of base **15** of tool **10** approximately 50% at beveled end **43** of staple pulling fingers **1,3,5** and **7** on base **15** of foot **11** of tool **10**.

Reduction of thickness of the two aforementioned areas along with approximate 20
 5 degree bevel **42** on crown **14** and on staple pulling fingers **1,3,5** and **7** on foot **11** of tool **10** facilitate easier manipulation of spike and nail puller **21** and easier positioning of staple pulling fingers **1,3,5** and **7** when pulling or removing either spikes and nails (see fig.4) or staples (see fig. 3)

Referring now to **Fig 3** showing top angle view of foot **11** of tool **10** to illustrate detailed
 10 staple and nail pulling geometry of tool **10** whereby staple pulling fingers **1,3,5** and **7** and staple clearance notches **2,4** and **6** define said geometry. (It should be noted that clearance notch **4** is also a component of nail puller **22**) Each of the four staple pulling fingers **1,3,5** or **7** measures approximately .250” in width and .375 in length as dictated by depth **53** of clearance notches **2,4**,and **6**. The afore mentioned geometry provides
 15 dimensioning for each or any individual staple pulling finger **1,3,5** or **7** to be positioned under staple bridge **47** and between staple legs **48** of industry standard ¼” staples **51**. Additionally, the .250 width of each individual staple pulling finger **1,3,5** or **7** in conjunction with .250” width **54** of each of the clearance notches **2,4** and **6** allows for any two adjacent staple fingers **1,3,5**,or **7** to be placed under bridge **47** and substantially
 20 between staple legs **48** for removing industry standard 1” staples **52**. Each of the staple pulling fingers **1,3,5** and **7** are provided with an approximate 20 degree bevel **43** on the

outermost tip to facilitate easier placement of staple pulling fingers 1,3,5 or 7 under staple bridge 47 for pulling.

Continuing to reference FIG 3, Nail puller 22 , integral to clearance notch 4 of foot 11 of tool 10 provides additional versatility for foot 11 in pulling nails 55. Nail puller 22

5 comprises a “V” shaped groove 4a arranged for receiving stem 56 of nail 55 .

Relief, 57 of nail puller 22 provides clearance for nail head 58 , and land 59 provides the base for relief 57 providing for substantial containment of nail head 58 when “V” shaped groove 4a of foot 11 is positioned under head 58 of nail 55 and substantially adjacent to nail stem 56 in preparation for pulling nail 55. Nail head relief 57 to measure

10 approximately $\frac{1}{2}$ ” diameter and .040” deep with center point 60 to be approximately $\frac{5}{8}$ ” from extreme end 61 of foot 11 of tool 10. Center point 60 also to define point where sides of “V” shaped groove converge.

Note: Referencing Fig. 3a showing a side and front view of foot 11 of tool 10 wherein optional geometry is outlined for nail puller 22 and the two center staple pulling fingers

15 3 and 5 wherein fingers 3 and 5 are bent slightly downward (see standard position 43-S) toward base 15 of foot 11 (see optional position 43-O) resulting in an offset of staple pulling fingers 3 and 5 approximately $\frac{1}{8}$ ” 80 below staple pulling fingers 1 and 7 for the purpose of easier insertion of nail puller 22 or staple pulling fingers 3 and 5 under nail head 58 or staple bridge 47 by allowing center area of foot 11 to make contact with

20 surface immediately under fastener to be removed before fingers 1 and 7 of foot 11 make contact with work surface 100. With the exception of the slight offset bend to fingers 3

and 5 as outlined herein, all other details of foot 11 of tool 10 remain as previously outlined.

Referring now to **Fig 4** showing spike and nail puller 21 on grip end 12 and diamond notch nail puller 23 detail of tool 10 wherein spike puller 21 is comprised of a “V”

5 groove 71 with “V” groove center 63 being approximately 5/8” from line extending across open end 64 of “V” groove 63 measured from base of bevel 42 on crown 14 of tool 10 and wherein “V” notch open end 64 is approximately 5/8” across. Relief 66 with a depth 67 of approximately .040” from surface 18 to land 68 is provided for further decreasing the overall thickness of foot print 40 of spike puller 21 of tool 10 allowing for
10 easier positioning of open end 64 of spike and nail puller 21 under head 44 in preparation for pulling. Relief 66 geometry is generally rectangular with one open end 64, and one radius end approximately 5/16”. Radius of relief 66 to be generated from a center common with “V” groove 71 center 63.

Diamond notch nail puller 23 is provided for pulling nails or spikes of extended length
15 and is punched or otherwise formed substantially through shank 13 at a point outlined previously in detailed description referencing drawings fig 2a and 2b.

Geometry of nail puller 23 is defined by minor axis 76 which is approximately 1/2” in length measured between points 74 and 75, and major axis defined by points 72 and 73 measuring approximately 1.0” there between. Points 72 and 73 to be on centerline 30 of
20 shank 13 of tool 10. Diamond shaped geometry of nail puller 23 allows operator the option to use a pushing motion in the X direction locking nail stem 65 into point 72 or a pulling motion in the Z direction locking nail stem 65 into point 73 prior to pulling.

Note: Spike and nail puller **21** and diamond shaped nail puller **23** are commonly used in conjunction with each other, and spike **69** description numbers are referenced for both pullers in following descriptions of operation for tool **10** outlined in 5b and 5c

Referring now to **FIG.5a**, illustrating the operation of tool **10** staple and nail pulling

5 capability wherein bevel **43** on extreme end **61** of staple pulling fingers **1,3,5** or **7** of foot **11** are placed under bridge **47** of staple **51** or **52** where base **15** of foot **11** is substantially adjacent to work surface **100** and shank **13** of tool **10** is approximately at 97 degrees to work surface **100** wherein force **62** is applied in a backward direction to front **17** of grip **12** end of tool **10** causing tool **10** to rotate about rocker **29** on foot **11** end of tool **10** thus

10 lifting staple pulling fingers **1,3,5** or **7** and extracting staple **51** or **52** from work surface **100**. The aforementioned procedure also applies when utilizing nail puller **22** on foot **11** end of tool **10** wherein bevels **43** on ends of adjacent staple pulling fingers **3** and **5** are forced between nail head **58** (see fig. 3) and work surface **100** to a point where nail stem **56** is substantially seated within the confines of “V” shaped groove in nail puller **22**

15 where by applying force **62** as outlined above, extracts nail **55** from work surface **100**

Referring now to **FIG. 5b** outlining operational description of spike and nail puller **21**

wherein “V” notch **63** of spike puller **21** located on grip end **12** of tool **10** is forced substantially under head **44** of spike **65** between underside of head **44** and work surface **100**, and wherein a downward force **62** is applied to back **18** surface approximately in

20 rocker **29** area of tool **10**. Functioning as a class 1 lever, tool **10** pivots around fulcrum **28** on back **17** face of shank **13** on tool **10** forcing upper side of land **68** (see fig.3) of spike and nail puller **21** substantially against underside of spike head **44** lifting and extracting

spike **69** from work surface **100** to a point where procedure outlined for fig. 5a can be employed when required to complete extraction of the nail. Diamond notched nail puller **23** can be implemented to complete removal of spike **69** as follows.

Referring to **Fig 5c** outlining the operational view of diamond notched nail puller **23** of tool **10** providing a means for the removal of longer or heavier nails or spikes.

Subsequent to spike head **44** being lifted from work surface **100** using spike and nail puller **21** as outlined in description referring to Fig 5b, diamond notch nail puller **23** is positioned over spike head **44** with back surface **18** of shank **13** facing up. Gripping tool **10** on the underside or front **17** of the foot **11** end , shank **13** of tool **10** is manipulated in either the **X** direction or the **Z** direction engaging stem **65** of nail or spike **69** into either of the two “V” grooves as indicated by points **72** or **73** which also define the major axis of diamond notch nail puller **23**. With foot print area **40** firmly adjacent to work surface **100** a lifting force **70** is applied to the underside of foot **11** approximately in the area adjacent to fulcrum **29** allowing tool **10** to be operated as a class two lever pivoting around fulcrum **28** on front **17** side of grip end **12** of tool **10**, providing force to underside of spike head **44** and allowing nail or spike **69** to be extracted from work surface **100**

It will be clear from the foregoing illustrations and description that the present invention demonstrates improved versatility in a roofing tool wherein a multiple of nail and staple removal capabilities are combined into one simple tool.

Although the present invention is described outlining particular embodiments, other variations, modifications or uses will become apparent by those skilled in the art. It is

the inventors intention therefore, that the present invention not be limited by the specific disclosure of the embodiments therein, but by the scope of the appended claims.

5

10

15

20